

**Work Order ID 50800**

August 6, 2009 9:08:40 AM



Page 1

Item ID: D212-664-207

Accept



Setup Start



Revision ID: A

Item Name: Crosstube Low Standard Aft

Stop



Start Date: 07/23/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan: *mt*Date: *09-07-31*

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

Draw Nbr

Revision Nbr

D212-664-247

Rev A

100

0.00



DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per PPP D212-664-207 CHG001

*for CL 09/08/14**5 09/08/14*

110

0.00



Packaging

Packaging

Packaging

Memo

0.00

*9/8/14 @ 5h*

120

0.00



CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D212-664-247 using CNC bender program and Folio FT

*DD**9-8-5*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 50800

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Item ID: D212-664-207

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Start Date: 07/23/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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130 QC15- Crosstube Dimensional Check

0.00

=> 809/08/05

(tc)



QC

Memo

0.00

Quality Control

140

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes  
1-Drill Rivet holes as per Dwg D212-664-247 using DT8972. 2-Drill pilot holes in tube as per Dwg D212-664-247 using DT8550 and DT8551 3-Ream hole to finish size in tube as per Dwg D212-664-247 4-Deburr & Inspect for surface damage. Repair damage within 1

44M9.8.5

11 9-8-5

150

0.00



Crosstubes Chemical Conversion

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

Chemical Conversion Coat Tube & Cuffs

1 0 - 44M7.8.5

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

**Work Order ID 50800**

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Item ID: D212-664-207

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Revision ID: A

Stop



Item Name: Crosstube Low Standard Aft

Start Date: 07/23/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

160

QC3- Inspect Part Finish

0.00

2) 809/08/10



QC

Memo

0.00



Quality Control

170

QC5- Inspect part completeness to step on W/O

0.00

2) 809/08/10



QC

Memo

0.00



Quality Control

180

Outsource process - NDT per QSI038 4.1

0.00



Outsource2

Memo

0.00

CY 09/08/11 ①

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038 □ Issue P/O: 10194 LPI as per  
ASTM 1417 □ Level 2 Attach copy of NDT results to work order

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Item Name: Crosstube Low Standard Aft

Stop



Start Date: 07/23/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190 	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Ensure copy of NDT results attached to work order.								
200 	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D412-664-203								
210 	Crosstubes	0.00							
Crosstubes	Memo	0.00							
Crosstubes	1-Rivet Cuffs as per Dwg D212-664-247. with Sika flex in Between tube & Cuff A/R SIKAFLEX -241/-291 BATCH: <u>112391</u>								

CL 09/08/11 ①

MM 09/08/11 ①

MM 09/08/12 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# Work Order ID 50800

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Item ID: D212-664-207

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Revision ID: A

Item Name: Crosstube Low Standard Aft

Stop



Start Date: 07/23/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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220

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2 □ 2-Paint outside crosstube with White Imron as per QSI 005 4.2 □ PRIME: □ Start Time: 10:00 □ Finish Time: 11:00 □ PAINT: □ Start Time: 4:00 □ Finish Time: 5:30

⇒ ml 09 08 12 ①

230

0.00



QC14- Inspect Spray Paint

QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

⇒ 85 09.08.13

240

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1- Assemble as per Dwg D212-664-247 □ 2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe □ 3- Instal support with magnobond 6398 per dwg D212-664-247, □ cure for 12hrs before packaging. □ Time & date of appli

⇒ ml 09 08 13 ①

9:00 / B111249  
exp. 02/2010

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries

**Work Order ID 50800**

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Item ID: D212-664-207

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Revision ID: A

Item Name: Crosstube Low Standard Aft

Stop



Start Date: 07/23/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

250

QC5- Inspect part completeness to step on W/O

0.00

=&gt; 8/02/14



QC

Memo

0.00

④

✗

Quality Control

260

QC4- 100% Inspect kits for completeness

0.00

=&gt; 8/02/14



QC

Memo

0.00

④

Quality Control

270

Packaging

0.00



Packaging

Memo

0.00

Burt

9/16/14 ④

Packaging

Identify and pack for shipping as per PPP D212-664-207

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 50800

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Item ID: D212-664-207

Accept



Setup Start



Revision ID: A

Item Name: Crosstube Low Standard Aft

Stop



Start Date: 07/23/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

09-08-14  
MF 09-08-14

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

August 6, 2009 9:21:33 AM

Page 1 16

Work Order ID: 50800

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft

Comments:

Start Date: 7/23/09

Required Date: 7/31/09

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
S D3428-1RevA		Manufactured	No			100	Each	56.0000	1.0000			
						260						
						5 changed on who 50877						
Placard												

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST

16

47310

6

48359

10

Main Warehouse

ST096

40

50790

40

D212-664-  
207TRNRevA

Manufactured No

140

Each

1.0000

0.0000



Crosstube Turning Detail

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

FG

1

50682

1

9/8/14

48359 SP

50877

9-7-30

# Picklist Print

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Work Order ID: 50800

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft

Comments:

Start Date: 7/23/09

Required Date: 7/31/09

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D3660-1RevB		Manufactured	No			220	Each	10.0000	2.0000			



CUFF

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST

10

44455

4

46705

6

240

Each

346.0000

44.0000

CR3212-4-06

Purchased

No



CHERRY RIVET

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST

346

107534

346

B44455 (2) K 9-8-5

B112314

09 08 12

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Shop Packet Print

Page 2



# Picklist Print

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Page 3 16

Work Order ID: 50800

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft

Comments:

Start Date: 7/23/09

Required Date: 7/31/09

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D2940-1RevB		Manufactured	No			240	Each	74.0000	2.0000			



Support

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST	74	
24367	4	
25594	2	
41536	10	
41870	20	
45203	18	
47748	20	

ml 09 08 13

D3595-063-530RevA

Manufactured No

240 Each 162.0000 4.0000



RUBBER CUSHION

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST	162	
40780	2	
44998	48	
50030	112	

ml 09 08 13

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Page 3

# Picklist Print

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Work Order ID: 50800

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft


Comments:

Start Date: 7/23/09

Required Date: 7/31/09


Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN6-40A  Bolt		Purchased	No			260	Each	63.0000	4.0000			

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	63	
111424	23	
112314	40	

111424 59

AN6-41A  Bolt		Purchased	No			260	Each	63.0000	2.0000			
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<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	63	
109371	13	
111605	50	

109371 50  
9/6/14 51

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# Picklist Print

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Page 5 16

Work Order ID: 50800

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft


Comments:

Start Date: 7/23/09

Required Date: 7/31/09

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
S AN960JD616  Washer		Purchased	No			260	Each	1,318.000	18.0000			


Warehouse                      Loc Qty                      Loc Code  
Location

Main Warehouse

ST	1318	
107242	3	
107959	6	
109371	8	
110704	23	
111193	10	
111607	268	
112314	1000	

111607

50

S MS21042L6  Nut		Purchased	No			260	Each	743.0000	6.0000			
---	--	-----------	----	--	--	-----	------	----------	--------	--	--	--

Warehouse                      Loc Qty                      Loc Code  
Location

Main Warehouse

ST	743	
105077	22	
110002	221	
111548	100	
111578	400	

110002

9/8/14  
39

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# Picklist Print

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Work Order ID: 50800

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft


Start Date: 7/23/09

Required Date: 7/31/09

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-28		Purchased	No			<del>260</del> 240	Each	142.0000	4.0000			
												
Clamp(per MIL-DTL-8783C)												

*Change to #5087*

## Warehouse Location

## Loc Qty

## Loc Code

### OFFSHORE

FG

5

105884

5

### Main Warehouse

ST

137

106864

5

108466

9

108847

7

109181

14

109965

2

111281

50

111734

50

*ml 09 08 13*

*[Handwritten signature]*

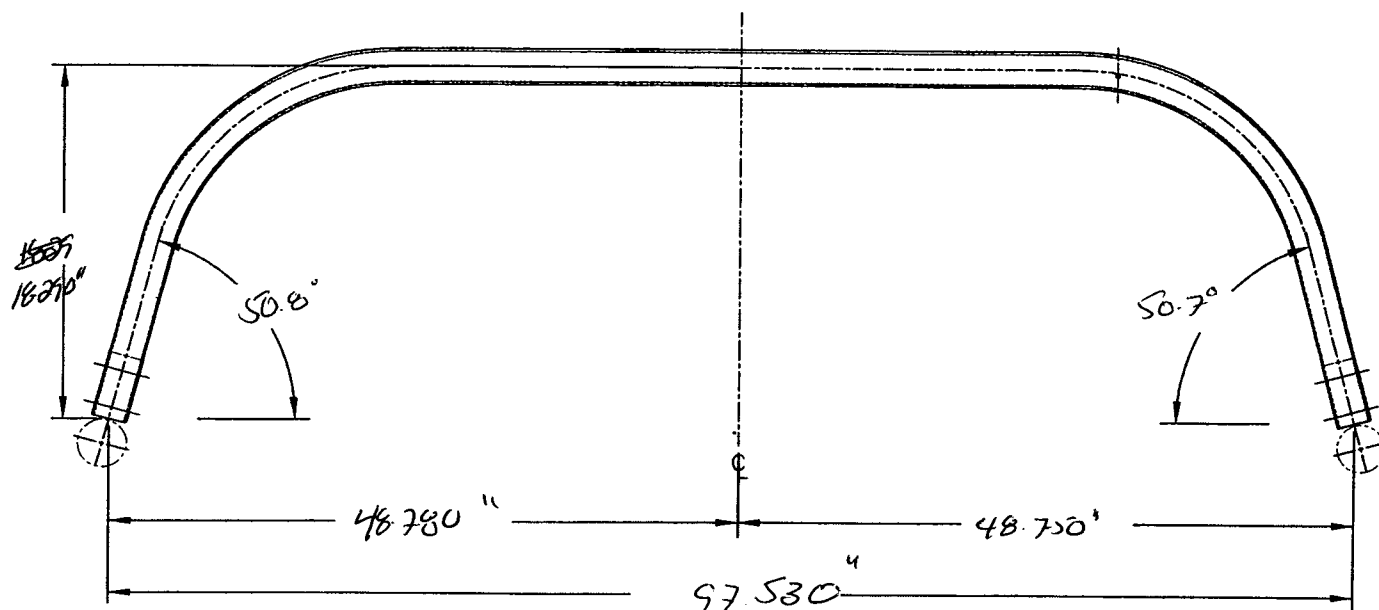
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Shop Packet Print

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DART AEROSPACE LTD		Work Order:	50800
Description: Crosstube Low Aft (205/212)		Part Number:	D212-664-207
Inspection Dwg: D212-664-247 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	18.16	18.42
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	S
Date	08/08/05

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	

**PARTS LIST:**

Qty	Part Number	Description
X	D212-664-247	CROSSTUBE ASSEMBLY (205/212 LOW AFT)
1	D6008-132	CROSSTUBE
2	D2940-1	SUPPORT
4	D3595-063-530	RUBBER CUSHION
2	D3660-1	CUFF
4	MS21920-28	CLAMP (OR MS21920-30)
44	CR3212-4-06	RIVET (OR M7885/3-4-06)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

# 50800  
MF  
09-08-05

**GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6008-132  
FINISHED LENGTH = 128.27±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) ALL DIMENSIONS ARE IN INCHES
- 5) PART IS SYMMETRIC ABOUT CENTERLINE.
- 6) WHEN MACHINING TAPER, RUN-OFF PART AT STOCK. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 7) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 8) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 9) SCRIBE DART PART NUMBER AND BATCH NUMBER ON INNER SURFACE OF TUBE WITH A VIBRATING STYLUS.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2940-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE D2940-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3660-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

DEO ATTACHED  
RELEASED  
07.09.24 #

A		07.07.07	NEW ISSUE
DESIGN	qP	DRAWN BY	qP
CHECKED	PH	APPROVED	#
DATE	07.07.07	TITLE	CROSSTUBE (205/212 LOW AFT)
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

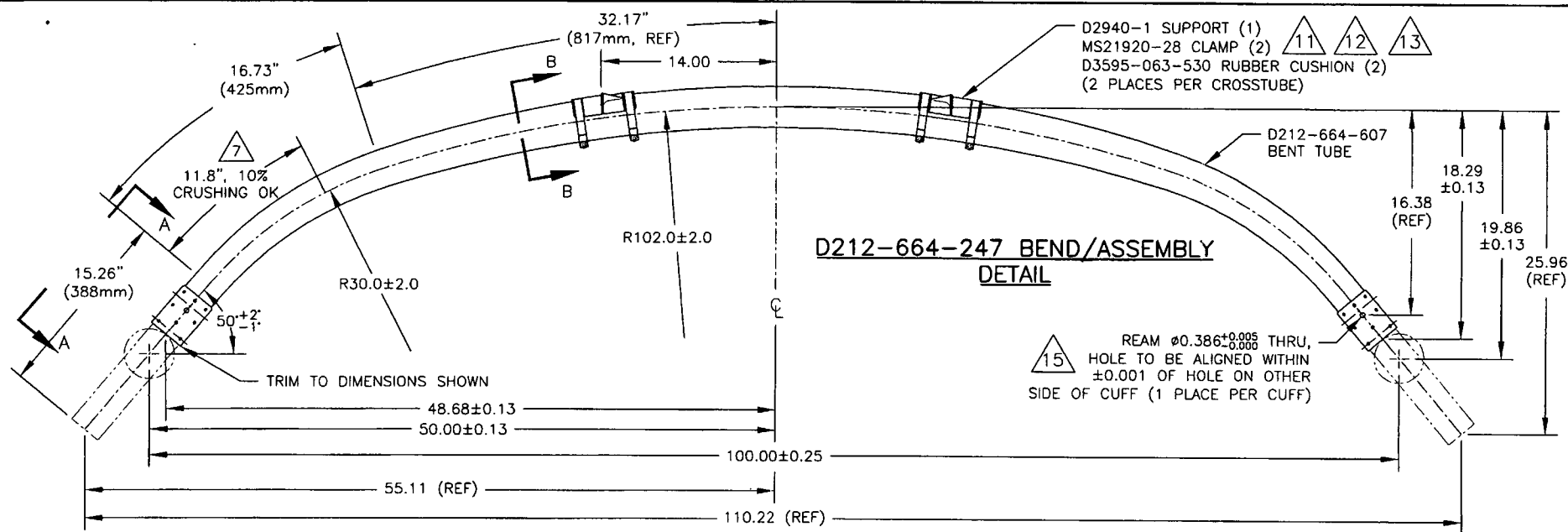
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

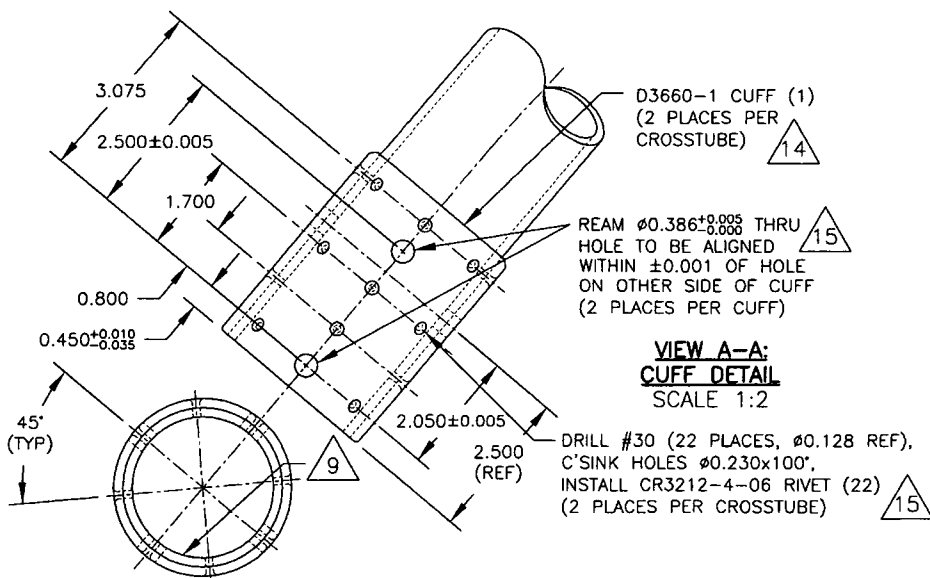
NOTE: Date & initial all entries

W/10 50800

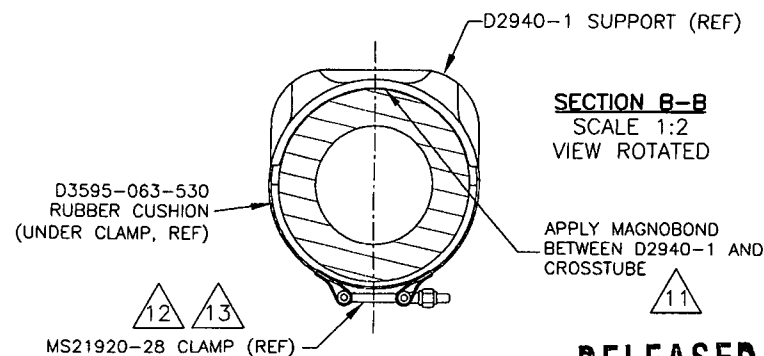


**D212-664-247 BEND/ASSEMBLY  
DETAIL**

REAM Ø0.386 ± 0.005 THRU,  
HOLE TO BE ALIGNED WITHIN  
±0.001 OF HOLE ON OTHER  
SIDE OF CUFF (1 PLACE PER CUFF)



**VIEW A-A:  
CUFF DETAIL  
SCALE 1:2**



**SECTION B-B  
SCALE 1:2  
VIEW ROTATED**

**DEO ATTACHED RELEASED**  
07.07.07

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		DATE	07.07.07			D212-664-247	SHEET 2 OF 3
						TITLE	SCALE
						CROSSTUBE (205/212 LOW AFT)	1:8



# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

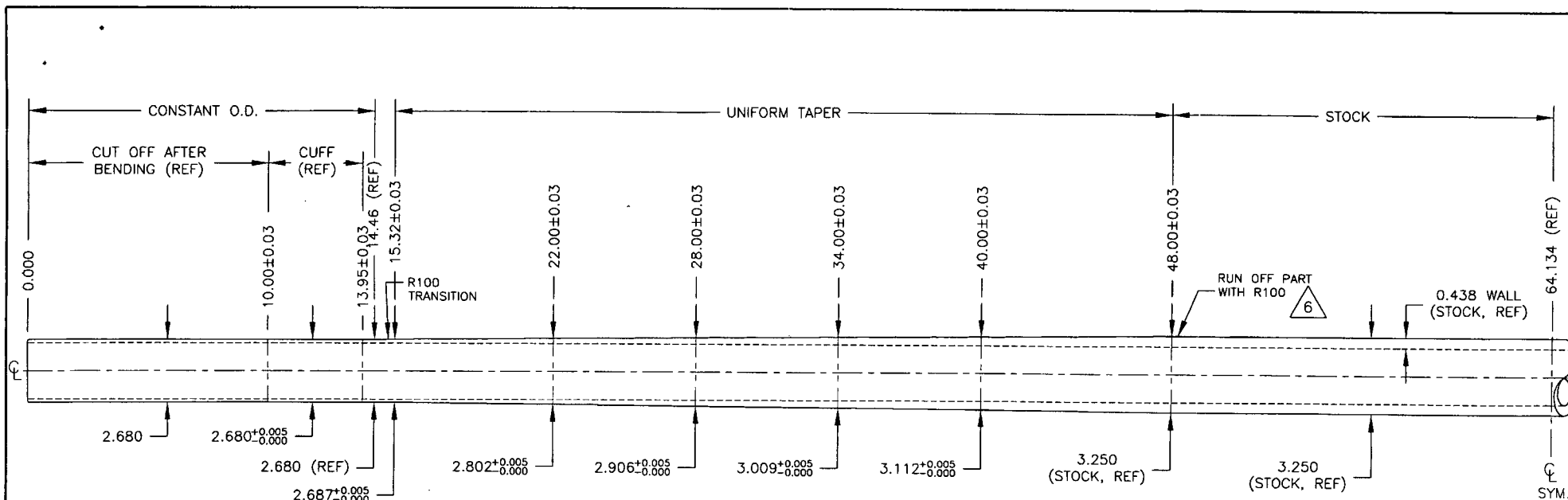
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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

W10 50800



# D212-664-247 MACHINING DETAIL

RELEASED

DEO ATTACHED

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DATE	07.07.07	DRAWING NO.		REV. A
		D212-664-247		SHEET 3 OF 3
		TITLE		SCALE
		CROSSTUBE (205/212 LOW AFT)		1:4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DRAWING NO. D212-664-247	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-247-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>UP</i>	CHECKED <i>PR</i>	MFG. APPR. <i>AA</i>	APPROVED <i>AMP</i>		DE APPR. <i>H</i>		
DATE 09.05.01	DATE 09.06.15	DATE 09/06/22	DATE 09/06/22		DATE 09.06.22		

**CHANGE:**

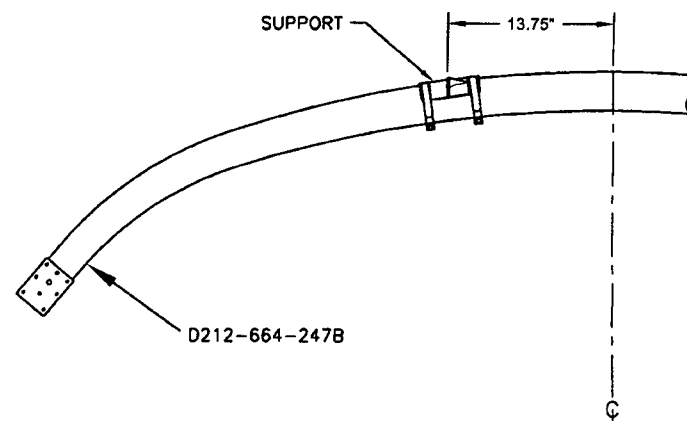
ADD THE FOLLOWING CROSSTUBE ASSEMBLY:

Part Number	Description
D212-664-247B	CROSSTUBE ASSEMBLY (214 LOW AFT)

THE D212-664-247B CROSSTUBE HAS THE SAME PARTS LIST AS THE D212-664-247 CROSSTUBE. HOWEVER, INSTALL THE SUPPORTS AS SHOWN IN FIGURE 1 OF THIS ENGINEERING ORDER. THE NEW KIT IS OTHERWISE ASSEMBLED PER THE D212-664-247 CROSSTUBE.

**RELEASED**  
*09/06/22*

*W/O SOW*



**FIGURE 1 - SUPPORT INSTALLATION**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



## LIQUID PENETRANT TEST REPORT

P-14945

CLIENT	<u>DART AEROSPACE</u>	DATE	<u>AUG-10-2009</u>	PAGE	<u>1</u>	OF	<u>1</u>
ATTENTION	<u>LINDA CHANTAL</u>	ACUREN JOB NO.	<u>188-09-001484</u>	TIME	AM <input checked="" type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	<u>1270 ABERDEEN ST.</u>	PO/VO NO.	<u>10194</u>	WORK LOCATION	<u>HAWKESBURY</u>		
	<u>HAWKESBURY ON. K6H-1K7</u>	ACCEPTANCE STD.	<u>ASTM 1417</u>	REV./DATE	<u>2007</u>		
PROJECT	<u>F.P.I. ON MACHINED PARTS - AND CROSS TUBES</u>						
ITEM(S) EXAMINED	<u>44 STUDS. 20 RAPPELS</u> <u>7 CROSS TUBES. + 12 STUDS.</u>						

JOB DESCRIPTION	PROCEDURE NO.	LT-0002	REV./DATE	TECHNIQUE NO.	LT-TECH-2	REV./DATE
PART NO.				MATERIAL	<u>STAINLESS STEEL</u>	THICKNESS
SCOPE	<u>WET FLOUORESCENT LIQUID PENETRANT INSPECTION</u> <u>CARRIED OUT 100% EXTERNAL</u>					

TEST DETAILS	
METHOD	<input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE
FAMILY BRAND	<u>MAGNAFLUX</u>
PENETRANT	<u>2L 67</u> MINIMUM DWELL TIME <u>45</u> MIN.
PENETRANT REMOVER	<u>H2O</u> MINIMUM DRY TIME <u>&gt;10</u> MIN.
DEVELOPER	<u>SKD 52</u> MINIMUM DWELL TIME <u>10</u> MIN.
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY
WATER WASH <input checked="" type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED <input type="checkbox"/>	
BLACK LIGHT S/N <u>16459</u> OUTPUT <u>&gt; 1000</u> $\mu$ W/cm <sup>2</sup> AMBIENT <u>&lt; 2</u> fc	
LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT <u>&gt;100</u> fc @ SURFACE	
OTHER <u>LABINO</u>	
LIGHT METER S/N	
CAL DUE DATE	
<u>DEC 8 - 2009</u>	

TEST SURFACE	
SURFACE CONDITION	<input type="checkbox"/> AS GROUND <input type="checkbox"/> AS WELDED <input type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F <input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F <input type="checkbox"/> 10°C/50°F TO 52°C/125°F <input type="checkbox"/> > 52°C/125°F

RESULTS-	<input type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL
<u>14 PCS STUDS - W.O. 509 33</u> ✓	
<u>20 PCS STUDS - W.O. 507 21</u> ✓ <u>29 x 10</u>	
<u>12 PCS STUDS - W.O. 509 32</u> ✓	
<u>10 PCS RAPPEL - W.O. 509 67</u> ✓	
<u>10 PCS RAPPEL - W.O. 509 68</u> ✓ <u>5 x 5</u>	
<u>1 CROSS TUBE - W.O. 510 83</u> ✓	
<u>1 CROSS TUBE - W.O. 510 84</u> ✓	
<u>1 CROSS TUBE - W.O. 510 85</u> ✓	
<u>1 CROSS TUBE - W.O. 508 73</u> ✓	
<u>1 CROSS TUBE - W.O. 508 27</u> ✓	
<u>1 CROSS TUBE - W.O. 508 00</u> ✓	
<u>1 CROSS TUBE - W.O. 508 26</u> ✓	
<u>MM 09 08 11</u>	
<u>TO BUFF AND EXAMINE - INDICATION</u>	
<u>TO BUFF AND EXAMINE - INDICATIONS</u>	
<u>- 6 ITEMS TO EXAMINE AFTER BUFFING</u>	
<u>- OTHER PCS FOUND ACCEPTABLE TO STANDARD.</u>	

Scope of Services  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES					
CLIENT REPRESENTATIVE	<u>CHANTAL LAVOIE</u>	PRINT	<u>Chantal Lavoie</u>	SIGNATURE	DTR # <u>E-20068</u>
TECHNICIAN (SIGNATURE):	<u>Mike Johnston</u>	PRINT	<u>Mike Johnston</u>	SIGNATURE	REPORT REVIEWED BY:
NAME (PRINT):	<u>Mike Johnston</u>	1 <sup>ST</sup> TECHNICIAN	<u>Mike Johnston</u>	2 <sup>ND</sup> TECHNICIAN	NAME INITIALS
CGSB LEVEL	<u>2</u>	SNT LEVEL	<u>6066</u>	CGSB LEVEL	SNT LEVEL
CGSB REG. No	<u>6066</u>	CGSB REG. No			

## 5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			D212-664-107	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
		X		D212-664-207	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
			X	D412-664-209	CROSSTUBE INSTALLATION, 412 STANDARD AFT
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

\*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE  
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA  
SKIDTUBES.

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Revision: F  
Date: 08.09.05